[10191/4396]

METHOD FOR RECORDING VIDEO/AUDIO DATA IN A NETWORK

Description

The present invention relates to a method for recording video/audio data in which the data are generated by a capturing device having a data memory.

5 Video data and/or audio data are generated within the scope of the so-called NVR concept (NVR - network video recording) at a video source of the capturing device, such as a digital camera or an analog camera that is coupled to a video server, and the digital data are then transmitted via a digital network to a
10 recording device which includes an appropriate data memory.

Starting from this, the present invention is based on the object of improving a method for recording video/audio data, of the kind mentioned at the outset, in such a way that the method may be used in a simple manner.

15 This object is attained, using the method of the present invention mentioned at the outset, in that the data memory of the capturing device is connected to at least one recording device that has a greater storage capacity than the data memory of the capturing device, and in that data are exchanged
20 between the data memory and at least one recording device, so that a virtual data memory is formed for the capturing device, using the recording device.

The recording device includes a data memory having a sufficiently large memory capacity which appears to be
25 "infinite", particularly to the capturing device. The data are filed in the recording device, and a data evaluation is carried out based on the filed data. Hard disks are usually

used for the data storage. Because of the attained object according to the present invention, it may be avoided that, at limited capacity, the data memory reaches the limits of its capacity. Data may be stored temporarily in a data memory
5   having a relative low capacity, and after being read out, may be transmitted to the network, the very much higher memory capacity in the recording device then being the effective memory capacity for the capturing device.

According to the present invention, a virtual data memory is
10 made available for the recording device, the physical memory capacity of the data memory of the capturing device being substantially smaller than the effective memory capacity.

In this context, the recording device with its data memory acts as s central recording unit, which may be utilized in
15 common by a plurality of independent capturing devices. The capturing device may be connected directly to the recording device(s) or, for example, may be interconnected to a digital network via which the data may be transmitted.

In a case where the data of a capturing device are to be
20 accessed also at the capturing device, one may then access both the data which are physically present in the data memory of the capturing device and the data of the recording device. Because of the development of a virtual memory, a user does not, however, have to carry out any different access, i.e. he
25 does not have to differentiate as to whether the data are physically present in the data memory of the capturing device or whether they are physically present in the data memory of the recording device, that is, they were transferred to external storage.

30 In particular, the data memory of the capturing device is a local data memory, which is provided for the purpose of temporarily storing data before they are transmitted.

The at least one recording device forms a central data memory
that has a high storage capacity, and which may be used in
common with a plurality of capturing devices, in order
effectively to increase the memory capacity by forming a
5   virtual data memory.

A system is made available that may be implemented cost-
effectively. It may be used flexibly and in an error-tolerant
manner.

It may be provided that the capturing device and/or the at
10   least one recording device are interconnected to a digital
network. In that case, data may be transmitted via this
digital network, and, in particular, data may be exchanged
between the data memory of the capturing device and the
central recording device via the digital network.

15   It is favorable if the reading out of data from the data
memory at the capturing device for transmission to the at
least one recording device is logically coupled to the input
of new data into the data memory. Thereby one may achieve that
the data memory at the capturing device does not overflow, but
20   that data are transferred to an external storage in time.

In this context, in particular, the input data are more
current in time than the data that are read out. The system
then works on a first in-first out principle, the older data
being just kept in reserve in the data memory in the sense of
25   a buffer storage.

It is quite especially advantageous if the data from the data
memory are copied for transmission, for example, (to a digital
network). The data are then read out, in order that they may
be transmitted. Because of this copying of the data, at an
30   effectively high storage capacity (determined by the memory
capacity of the recording device, which receives the data) the

memory capacity at the capturing device may be kept low, in order thus, in turn, for example, to keep usage of space of the capturing device and current usage low. Because of the data storage at the capturing device, i.e. at the data source

5   for the video data and/or the audio date, in this context, even during interference in the data transmission, data that come up may be temporarily stored, in order thus not to generate any lasting data gaps in the recording at the recording device.

10   In particular, the transmitted data are received by a recording device that records the data received in order, for example, to store them and/or to perform an evaluation based on the recorded data. Such a data evaluation is described in connection with an access control system in the not

15   prepublished German Patent Application # 10146 821.0 of September 20, 2001 by the same applicant. Reference is made explicitly to this Application.

In one variant of an exemplary embodiment it is provided that data are input into the data memory at the same rate as that

20   used for reading out data from the data memory. In this context, in particular, the data are continuously read out from the data memory.

It may also be provided that data from the data memory are read out at time intervals, i.e. in time packets.

25   In this connection, it is then advantageous if data from the data memory are read out at a higher rate than that at which new data are input into the data memory, in order to avoid large changes in the filling up of the memory.

In this context, the reading out of data may take place when a

30   certain threshold is reached, the threshold being determined, for example, with respect to the memory capacity. If, for

example, a threshold of 50% of the memory capacity of the data memory is exceeded, this may be used as an initiation signal to effect the reading out of data for transmission to the digital network.

5   It is quite especially favorable if data are stored in the data memory in order to make available a buffer function for the data transmission to the digital network. In that case, temporary interferences in data transmission to the digital network may be bridged without loss of data, since the data
10   are, after all, stored at the capturing device and thereby the data coming in during the interference time are not lost.

In order to be able to develop the data memory so as to have a relatively low memory capacity, it is advantageous if data are deleted from the data memory after their successful
15   transmission.

In this connection, it is then advantageous if a recording device, which receives transmitted data, checks these data for intactness, and notifies the recording device of the capturing device of the intactness. Based on the appropriate
20   notification, the corresponding storage area of the data memory may then be deleted.

It may then be provided that the at least one recording device has different storage areas which correspond to different recording durations. It is thereby possible, for example, to
25   store data volumes allocated to different capturing devices. For instance, a capturing unit such as a camera has to monitor an area in which data have to be recorded over several days, that is, have to be stored, while another camera only has to record data that include few hours. By allocating different
30   storage areas, this may be taken into consideration.

Thereby it becomes possible to store large data volumes, at the same time, a certain data volume being held "in situ" as security against failures, particularly of the digital network.

5   In particular, the different storage areas are allocated to different capturing devices or to different capturing units of a capturing device. Because of that, different recording times (that is, data volumes that have come about in different time intervals, and which may, in part, also overlap) may be
10   recorded.

In particular, the different storage areas are allocated to different recording lengths in time. Thereby, depending on requirements, different recording times may be implemented. In this context, it is favorable if the recording time for a
15   certain capturing unit, such as a camera, is adjustable, and especially independent of the storage space on the capturing device. The recording duration, i.e. for the time duration in which data have to be captured and stored, is then not determined by the capacity of the capturing device or the
20   capturing units, but at most by the capacity of the capturing device.

In particular, the data memory of the capturing device has a capacity corresponding to a temporal duration of the data accrual, so that a certain data volume is able to be stored in
25   situ on the capturing device. This makes available security with respect to failures in the transmission of data in the digital network.

When a time limit is exceeded, the data are then transmitted to the recording device. This yields the possibility of
30   storing large data volumes.

The present invention also relates to a capturing device for video/audio data which includes an interface for communications with at least one central recording device, via which data are able to be transmitted to the at least one

5   recording device.

In this context, according to the present invention, a data memory and a control device for the data memory are provided, the input of new data into the data memory being interconnectible with the reading out of older data for

10   transmission to the recording device, in order to form a virtual data memory using the recording device.

The advantages of the capturing device according to the present invention was explained above, in connection with the recording method according to the present invention.

15   Further advantageous specific embodiments were also explained above, in connection with the recording method according to the present invention.

In particular, it is favorable if, via the control device, data from the data memory are able to be copied from the data

20   memory for transmission. Thereby it may be ensured that no data are lost even in response to interferences in the transmission. Furthermore, the storage capacity with respect to the capturing device may thereby be increased beyond the physical storage capacity, since, because of the data copying,

25   a data memory of the recording device interconnected with the digital network, "virtually" makes available its storage capacity to the capturing device.

In particular, data distanced in time are able to be read out from the data memory for transmission, using the control

30   device, so that it is possible to read out data stored at distances in time.

The present invention also relates to a recording system for video/audio data which includes at least one capturing device according to the present invention and at least one recording device whereby the data sent by the at least one capturing device are able to be stored.

The recording device according to the present invention has the advantages that have already been explained in connection with the method according to the present invention and with the capturing device according to the present invention.

The following description of preferred specific embodiments is used, in connection with the drawings, for a more detailed explanation of the present invention.

The figures show:

Figure 1   a schematic representation of an NVR
                     video/audio system;

Figures 2a, 2b   a schematic representation of the data
                     recording during interferences in the
                     network transmission;

Figures 3a to 3d   schematically, the data transmission after
                     the end of an interference in the network
                     transmission;

Figure 4   a schematic representation of components
                     of an exemplary embodiment of the
                     capturing device according to the present
                     invention.

Figure 5   a schematic representation of components
                     of an exemplary embodiment of the
                     recording device according to the present
                     invention;

| Figure 6 | a schematic representation of an exemplary embodiment of a memory management according to the present invention; |

| Figure 7 | a schematic representation of an additional exemplary embodiment of an NVR system; and |

| Figure 8 | schematically, the memory content at a capturing device in the case of an NVR system as in Figure 7. |

A recording system for video/audio data according to the NVR principle (NVR - networked video recording), shown in Figure 1 and designated there as a whole by the number 10, includes one or more capturing devices 12, 14, which make available video/audio data. In this context, these video data and/or audio data are generated in time sequence and made available as digital data or converted to digital data, and transmitted on a digital network 16 to a recording device 18 (network video recorder), which, in particular, permanently records the data supplied by capturing devices 12, 14, in order, for example, to be able to store them and evaluate them. Recording device 18 is used as a recording server.

Capturing devices 12, 14 include cameras and/or microphones. In this context, it may be provided that a capturing device (in Figure 1 capturing device 12) has a digital camera 20 and/or a digital microphone; in that case, digital video data and/or audio data are made available directly.

Alternatively or additionally it may be provided that analog capturing units, such as an analog camera 22 and/or an analog microphone are provided. Postconnected to these, there is, as an analog to digital converter, for instance, a video server 24, in order to be able to make available the corresponding

digital data that are able to be transmitted on digital
network 16.

Digital network 16 is particularly a preexisting network that
is independent of system 10. Capturing devices 12, 14 and
5   recording device 18 then have appropriate communications
interfaces 25 (Figure 4) and 29 (Figure 5), using which, these
are respectively able to be interconnected with digital
network 16, in order to be able to pass data to digital
network 16, that is, to be able to transmit data over digital
10   network 16, and in order to be able to receive data from
digital network 16.·

With respect to digital network 16, a public network may be
involved, such as the Internet, an ISDN network, a GSM network
or an UMTS network.

15   But a proprietary network may also be involved, which is
formed over leased lines. An example for such a network is an
intranet owned by a company. Digital network 16 may be a local
network (LAN - local area network) or a non-local network (WAN
- wide area network).

20   The data are transmitted on digital network 16 according to a
certain protocol, such as TCP/IP.

What is characteristic with video data and audio data is that
there is a data sequence in time, that is, there is a data
flow, the succession in time being of decisive importance for
25   the evaluability and storage. The data are (inherently)
provided with a timing mark, which characterizes their
temporal categorization. The data captured in time sequence by
capturing devices 12, 14 also have to be recorded in this
sequence at recording device 18, in order to make possible an
30   evaluability. In NVR systems 10 there is the problem, in this
context, that interferences in data transmission on digital

network 16 may lead to gaps in the recording of recording device 18.

Now, according to the present invention, it is provided that the video data and/or the audio data delivered, for instance,

5   by digital camera 20 of capturing device 12 and/or video server 24 of capturing device 14, are also recorded at the data source, in order, after an interference in the data transmission on digital network 16, to be able to make available data that were generated during the duration of the

10   interference by digital camera 20 or analog camera 22.

For this, a respective data memory 26, 28 is allocated to capturing device 12, 14, by which the video data and/or audio data may be recorded independently of the recording at recording device 18, but specifically at the data source,

15   before the data transmission.

Data memories 26, 28 may be volatile or nonvolatile memories. However, nonvolatile memories such as hard disk storage are preferred. Such data memories 26, 28 may, in this context, be integrated into the housing of digital camera 20, for

20   instance, or of video server 24, or may be situated separately. But they are in each case components of the appertaining capturing device 12 or 14.

Recording device 18 also has one or more data memories 30, such as hard disk drives, the storage capacity of recording

25   device 18 being substantially larger than the storage capacity of data memory 26 or 28 at the data source.

The data recording at capturing devices 12, 14, that is, at the data source, takes place independently of the data recording at recording device 18, that is, independently of

30   the data receiver of the data transmitted over digital network 16 by capturing devices 12, 14.

The capturing devices, such as capturing device 12, in each
case include, as shown schematically in Figure 4, a control
device 32 which may be implemented as a hardware solution or a
software solution, and which controls the data recording at
5   data memory 26, that is, especially the input and readout of
data, these data being supplied by digital camera 20.

Control device 32 is interconnected at interface 25, in order
to be able to send appropriate data onto digital network 16,
and to be able to receive signals from digital network 16.

10   A detection device 34 is also provided, which is
interconnected at interface 25, via which test signals (life
check signals) are transmittable to digital network 16, and
corresponding life check signals are able to be received from
the digital network. These life check signals, which are, for
15   instance, sent off at strictly set time intervals, are used
for detecting interference in the data transmission on digital
network 16. Such interferences are caused, for example, by
network components such as switches, routers or the like
having failed, or by components being connected to digital
20   network 16 in a faulty manner or not at all, or caused by
great network traffic making the data transmission rate on
digital network 16 insufficient.

Capturing device 12, in this context, exchanges this life
check signal with recording device 18, which also has a
25   detection device 36, that is in contact with interface 29
there. Data transmission interferences on digital network 16
may be detected and registered both by capturing device 12 and
by recording device 18, by the exchange of life check signals
between capturing device 12 (and possibly additional capturing
30   devices 14, etc) and recording device 18.

For this, there is provided, respectively, a registration
device 38 at capturing device 12 and a registration device 40

at recording device 18. These registration devices 38, 40 keep
.a log" regarding data transmission interferences on digital
network 16, especially with regard to the points in time of
status changes in the interference. Thus the point in time of
5   an interference is registered, as well as the duration of such
an interference.

Using this, capturing device 12 may then generate data as to
which video data and or audio data (corresponding to a certain
time interval) were not, or not successfully transmitted to
10   recording device 18, that is, which part of the data flow was
not transmitted, and recording device 18 is able to generate
the data as to when in the recording there is a data gap based
on interference in the data transmission. Registration devices
38 and 40, in this context, are synchronized with each other
15   via the life check signals, so that registration devices 38
and 40 receive the same information with respect to point in
time and duration of data transmission interference on digital
network 16.

Registration device 38 is connected to control device 32, so
20   that it is able to control data transmission, based on stored
status data with respect to data transmission interference. In
the same manner, registration device 40 is connected to a
control device 42 of recording device 18, this control device
42 particularly controlling the recording by data memory or
25   data memories 30. Control device 42 of recording device 18 is
also connected to an evaluation device 44, via which the
recorded data are able to be evaluated.

The method according to the present invention works as
follows:

30   The data are stored at the data source, such as capturing
device 12, independently of recording device 18, that is, this
data recording at the data source takes place in a manner

preconnected to digital network 16, and therewith independent
of possible data transmission interference on digital network
16. The storage capacity of data memory 26, in this context,
is selected in such a way that, at a certain data transmission

5   rate to digital network 16 and on digital network 16,
videodata and/or audio data are recorded at the data source
for a prespecified duration. The prespecified duration, in
this context, is adjusted to the maximum expected duration of
the data transmission interference. If, for example, the data

10   transmission for the video/audio data flow is 1 megabit per s,
and if a maximum interference time of 8 hours is expected, the
storage capacity of data memory 26 is at least 4 gigabytes,
with a safety factor being taken into consideration.

Preferably, this storage capacity should be doubled, in order

15   to make possible the input of data (for protection against
data losses during a possible network interference) during the
readout of buffered data from data memory 26.

Figures 2a and 2b schematically show the recording procedure
during interference 46 of data transmission on digital network

20   16. During time period T of the interference (Figure 2b),
recording device 18 receives no captured data, so that a data
gap 48 is present in the recording of data memory 30.
Interference 46 is shown in exemplary form, and is intended to
symbolize every possible interference source in the data

25   transmission. The interference may also be present, for
instance, in the region of the interconnection of data memory
26, or, for example, in network 16.

By the design approach, according to the present invention,
concerning the data recording at the data source by data

30   memory 26, the data are also, however, recorded independently
of recording device 18, and, as a matter of fact, without a
gap, since the data recording, in fact, takes place at the

data source. This is depicted in Figure 2b. The data that have accrued during the interference of the data transmission on digital network 16 are thus stored in data memory 26, so that with this, data gap 48 in data memory 30 of recording device 18 is able to be filled in after the disappearance of the transmission interference.

Detection devices 34, 36 respectively of capturing device 12 and of recording device 18 detect interference 46, in this context, via the exchange of the life check signals, and the corresponding status data are stored in registration devices 38, 40, so that data gap 48 is able to be categorized with regard to time, both at capturing device 12 and recording device 18, that is, the time of the beginning of data gap 48 and the time of ending of data gap 48 (and therewith also the length in time of data gap 48) are known.

A freedom from interference of the transmission on digital network 16 is detected via the exchange of the life check signals by test devices 34, 36. This state is depicted following interference state 46 in Figure 3a. At the beginning of the detection of the freedom from interference, data gap 48 is contained in the data recording of recording device 18, while the missing data in the data recording at the data source are present, that is, included in data memory 26 (Figure 3b). The corresponding data 50 are now read out from data memory 26 by control device 32, in the light of the input into registration device 38, and are transmitted on digital networ,.k 16. Control device 42 of recording device 18 places these data in storage area of data memory 30, which corresponds to data gap 48 (Figure 3c). Thereby is completed the data recording at recording device 18, that is, complete data are present here without gaps, and thus a complete data flow is also recorded there. This is depicted in Figure 3d.

Consequently, via the data recording at the data source, that is, allocated to capturing device 12, data gaps 48 at recording device 18, based on interference in data transmission on digital network 16, may be "repaired", that

5   is, the missing data are read out from data memory 26 and input into data memory 30. In this context, this procedure takes place via control devices 32 and 42, in particular, automatically, so that, at least delayed in time, there is made possible a complete data record, with respect to the data

10   generated by digital camera 20, at recording devive 18. According to the present invention, an fault-tolerant, network-based video/audio data recording method is made available.

     It may be provided that recording device 18 records

15   interference in the data transmission on digital network 16, and, based on the detection of interference, initiates further steps, and especially requests data from capturing device 12. This data request is schematically indicated in Figure 1 by arrow 54; recording device 18 sends corresponding signals via

20   digital network 16 specifically to a capturing device, such as capturing device 12, or to all capturing devices 12, 14, in order to induce these to send the data missing at recording device 18.

     Thus, after the establishment of transmission interference, as

25   recording server, recording device 18 itself initiates the necessary steps for acquiring the missing data.

     It may be provided alternatively, or in combination, that capturing device 12 is developed to be "intelligent", and is able, itself, to detect interference in digital network 16.

30   After the detection of such an interference 16 capturing device 12 then itself initiates the steps required for making available the missing data to recording device 18. This

automatic making available of data is indicated in Figure 1 by arrows 56 for capturing device 12 and 58 for capturing device 14.

In this context, capturing device 12 (or capturing device 14) then sends at the same time current data for recording to recording device 18 and stored data for filling up a data gap to recording device 18. Thus, two kinds of data are transmitted, namely current data and repair data. The data packets may, for instance, be distinguished by appropriate characterizations, such as timing marks.

One design approach in which the capturing device or the capturing devices detect interference and then make available repair data independently of recording device 18, is especially sensible if, for instance, there is a plurality of cameras 20, 22.

The data made available by a capturing device 12 have an especially inherent timing mark. Upon receipt of such data, recording device 18 is able to use the repair data in the right location, based on the timing mark, especially via its control device 42.

The capacity of data memory 26 at capturing device 12 or data memory 28 at capturing device 14 is usually limited, if for no other reason than space. However, using the recording method, according to the present invention, of video/audio data it is possible to increase the memory capacity at the data source by forming a virtual data memory. This is shown schematically in Figure 6 in the light of capturing device 14.

Data memory 28 of capturing device 14 has a certain capacity 52. Data memory or memories 30 of recording device 18 has/have a very much larger capacity. Now, it is provided, according to the present invention, that data memory 28 and data memory 30

are connected. This is described, for example, in the light of a connection via digital network 16. Thereby, the reading out of data from data memory 28 for transmission of these data on digital network 16 may be logically interconnected to the

5   input of new data into data memory 28. Because of this interconnection, a virtual data memory is made available to video server 24 (or, in the case of capturing device 12, to digital camera 20), whose capacity is greater than the physical capacity of data memory 28 (or 26).

10   Thereby, a data memory having „infinite" capacity is allocated to capturing device 12 or 14, this virtual data memory at least having a capacity that is very much greater than the capacity of data memory 28 of capturing device 14.

These data are copied by reading out the data from data memory

15   28 for transmission on digital network 16; that is, the same data set is present once in data memory 28, and secondly, it is transmitted over digital network 16 and then stored in data memory 30. After the successful recording of these data by recording device 18, and the checking of the data for

20   intactness, the transmitted data may then deleted from data memory 28.

The input of data into data memory 28 takes place continuously, in this context, based on the supply of new data, for instance, by the analog camera. The readout

25   procedure of the data from data memory 28 for transmission of these data on digital network 16 to recording device 18 may, in this context, also take place continuously, and especially at the same speed as that of the input of the data.

It may also be provided that the data from data memory 28 be

30   read out at time intervals in the form of data packets, and then transmitted on digital network 16. This readout procedure is controlled, in this context, especially in that a certain

capacity threshold is reached, such as a capacity threshold at
or below 50% of the overall capacity of data memory 28. The
readout procedure (that is, the copying procedure) then takes
place at a speed that is greater than the input speed into
5   data memory 28.

It is preferably provided that current data are input into
data memory 28, while older data are copied to digital network
16 for recording at recording device 18. The storage
management of data memory 28 then takes place according to the
10   FIFO principle (first in, first out).

This process of copying the data from data memory 28 for
transmission on digital network 16 takes place, in this
context, controlled by control device 32.

Control device 32 is in contact with control device 42 of
15   recording device 18, in order to obtain a release, after
receipt of transmitted data by recording device 18, if the
data received by recording device 18 are intact. After such a
release, the copied data may then be deleted from data memory
26.

20   Because of the method according to the present invention for
recording video/audio data, the storage capacity of capturing
device 14 (and of possible further capturing devices 12) may
be greatly increased. It may thereby be ensured that data
memory 28 does not reach its capacity limits at the data
25   source.

The procedure of copying of data between data memory 28 of
capturing device 14, and data memory 30 of capturing device 18
takes place so to speak invisibly to capturing device 14, or
rather transparently; only a smaller part of the data is
30   actually, physically in data memory 28 of capturing device 14.
A greater part of the data is transferred to an external

location in data memory 30, the data included in data memory
30, however, being also able to be read out via capturing
device 14.

5   If a user wants to read out data at capturing device 14, he
cannot distinguish whether the data originate directly from
data memory 28, that is, whether they are physically there, or
were transferred to external storage in data memory 30, and
first have to be retrieved from there.
10
Data memory 30 and recording device 18 are a central recording
unit, with respect to capturing devices 12 and 14, which are
able to be used in common by a plurality of independent
capturing devices, in order, via the development of a virtual
15   data memory, to increase the storage capacity, likewise
virtual, at the individual capturing devices.

It was described above that data memory 30 is situated at a
recording device 18, which is connected via digital network 16
20   to capturing devices 12 and 14. However, it may also be
provided that the connection does not take place via a digital
network but, for example, by direct wiring.

In combination with the recording method according to the
25   present invention, which was described above, one may then
tolerate temporary interferences in the data transmission on
digital network 16 without loss of data at recording device
18. The storage capacity, and particularly the hard disk
capacity of data memory 26 may be adjusted to the transmission
30   rate and the maximum interference duration expected.

The "actual" data recording for storage and evaluation of the
data takes place at recording device 18, which has a
considerably greater storage capacity. Because of the data

buffering at the data source, data gaps based on interference in the data transmission may be filled in.

Because of the design approach according to the present
5   invention, an interference in the data transmission on digital network 16, during data copying onto digital network 16, may also be intercepted.

It may be provided that, as shown schematically in Figure 7, a
10   capturing device 60, which includes, for example, a video server, has a plurality of recording units 62a, 62b, 62c, 62d, etc. The capturing devices may particularly be cameras. These recording units 62a, 62b, 62c, 62d monitor different regions, there possibly being present different requirements with
15   respect to the duration of the recording. The requirements may be based on practical considerations or also on legal regulations. Thus, for example, there are regulations that, in the case of certain localities, the data for emergency exits have to be kept for 90 days. Therefore, for differently
20   observed regions (corresponding to the different capturing units and especially cameras 62a, 62b, 62c, 62d) different recording durations may be provided.

This is explained in the following in the light of a concrete
25   example, in which the region monitored by capturing unit 62d is monitored at a 12-hour recording duration, the region allocated to capturing unit 62c at a 24-hour recording duration, the region allocated to capturing unit 62b at a 10-day recording duration and the region allocated to capturing
30   unit 62a at a 90-day recording duration.

A data memory 64 of capturing device 60 has a certain recording capacity, such as 24 hours (indicated in Figure 8 by the upper partial figure).

A recording device 66 having a data memory 68 which has a
considerably greater capacity than data memory 64, is used as
a recording server for the data made available by capturing
5   device 60 via digital network 16. A virtual data memory, as
described above, is formed for capturing device 60 by this
data memory 68, whereby the capacity limitations of data
memory 64 may be lifted.

10   Data memory 68 has reserved storage area 70a, 70b, 70c, these
storage areas being allocated to the corresponding recording
durations. For example, storage area 70a is allocated to
capturing unit 62a, storage area 70b is allocated to capturing
unit 62b and storage area 70c is allocated to capturing unit
15   62c, along with the corresponding recording times.

If a certain capacity boundary in data memory 64 is exceeded,
that is, when, for example, (as indicated in Figure 8) 50% of
storage capacity has been reached, then, as was described
20   above, data are "transferred to an external location", by
transmitting them to recording device 66 and storing them in
its data memory 68. The virtual memory formed for capturing
device 60 is indicated by connection 72.

25   The data of capturing unit 62d do not have to be transmitted
to recording device 66, since, in the case of the numerical
example mentioned above, data memory 64 has a great enough
capturing capacity, i.e. in data memory 64 data having the
required length in time are always stored.
30

Data which originate with capturing unit 62c are transmitted
to recording device 66 and are stored there in storage area
70b having the required recording duration (24 hours

retroactively from the current point in time). The same applies to the storage of data that originate with capturing units 62 and 62b.

5   Even if the storage capacity of data memory 64 is not sufficient for the data that reflect a longer time period, the recording of specifically these data over the required time period is ensured by the virtual storage concept, that is, the data are secured in data memory 68. However, a certain data

10   volume is always held "in situ", which means in data memory 64 of capturing device 60.

One thereby obtains a security against failures, especially in the transmission of data on digital network 16. At the same

15   time, however, the possibility of storing large data volumes is ensured, namely in data memory 68 of recording device 66.

In this context, it is favorable if the storage duration, that is to be allocated to a capturing unit 62a, 62b, etc, is

20   adjustable and, in this context, adjustable independent of the specific storage location in data memory 68.

It may be provided in principle that the transmission rate for repair data, which are made available to recording device 18 or 66 is greater than the transmission rate for current data.

25   Current data are those data that are transmitted to recording device 18 or 66 without interference in digital network 16. Thereby it is ensured that data gaps at recording device 18 or 66 are quickly filled in.

30   It is also basically possible that the transmission rate for repair data could be less than the transmission rate for current data. Thereby one may ensure, especially at a prespecified bandwidth, that the influencing of the

transmission of current data is minimized by the additional transmission of repair data. If, for example, a large volume of repair data has accrued, then it is favorable if a low transmission rate for repair data to recording device 18 or 66

5   is selected.

It may be provided that the transmission rate for repair data is adjustable. In this context, the setting may take place, depending on the application, at the data source or at

10   recording device 18 or 66 (if the latter requests repair data). In that way, one may achieve a flexible adaptation to the actual facts as they are.

It is also possible to position the repair data that are to be

15   transmitted in a queue, in a graduation by time. The transmission rate for the repair data may then, for example, be selected as a function of the length of the queue. It is also alternatively or additionally possible to incorporate the repair data in the queue according to its priority, which is

20   determined, for instance, by the corresponding timing marks, and then to take care of the transmission to recording device 18 or 66.